Title: A Trip to the Zoo!

Brief Overview:

The students travel on an imaginary trip to the zoo. They become immersed into a kingdom of mathematics! Fractions, decimals, and percentages dominant their travels. Come explore these challenging activities that will captivate your audience's needs while finding a love for math.

Links to Standards:

- **Mathematics as Problem Solving**
  Students will demonstrate their ability to solve problems in mathematics including problems with open-ended answers, problems which are solved in a cooperative atmosphere, and problems which are solved with the use of technology.

- **Mathematics as Communication**
  Students will demonstrate their ability to communicate mathematically. They will read, write, and discuss mathematics with language and the signs, symbols, and terms of the discipline.

- **Mathematics as Reasoning**
  Students will demonstrate their ability to reason mathematically. They will make conjectures, gather evidence, and build arguments.

- **Mathematical Connections**
  Students will demonstrate their ability to connect mathematics topics within the discipline and with other disciplines.

- **Estimation & Computation**
  Students will demonstrate their ability to apply estimation strategies in computation, with the use of technology, in measurement, and in problem solving. They will determine reasonableness of solutions.

- **Number Sense & Operations**
  Students will demonstrate their ability to describe and apply number relationships using concrete and abstract materials. They will choose appropriate operations and describe effects of operations on numbers.

- **Fractions & Decimals**
  Students will demonstrate and apply concepts of fractions, mixed numbers, and decimals; use models to relate fractions to decimals and to find equivalent fractions; compute with whole numbers, fractions, and decimals; and apply fractions and decimals to problem situations.

Grade/Level:

Grades 3-5

Duration/Length:

This lesson will take approximately 5-6 class periods (45 minutes each).

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- naming decimals to the hundredths place
- recognizing fractions as part of a whole
- adding and subtracting fractions
- organizing data and choosing appropriate graphic representation
- estimating fractions to whole numbers closest to 0, 1/2, 1
- converting percentages to decimals and fractions or use the Explorer Calculator for assistance
- completing and interpreting data on a chart

Objectives:

Students will:

- work cooperatively in groups.
- select an appropriate operation to solve problems.
- add and subtract fractions with like and unlike denominators.
- estimate before calculating.
- become proficient with the Explorer Calculator.
- arrange decimals from least to greatest.
- apply fraction, decimal, and percent to real-life situations.
- reduce fractions to simplest form.
- compare fractions to other fractions.
- complete and interpret data.

Materials/Resources/Printed Materials:

- activity worksheet for each group of two
- a calculator for each group of two
- scrap paper
- marker, crayon, or colored pencils
- cuisenaire rods
- decimal squares

Development/Procedures:

Present the following situation to the class:

- Your class is going on a field trip to the zoo. You are really excited because you can't wait to see the new African exhibit. Throughout your trip, you are going to observe the African grasslands. You are going to be required to determine the amount of food certain animals will eat, decide how many visitors are allowed to view an exhibit at once, and estimate/calculate the weights of various animals.

- Help students discover the three main areas they will be investigating.

- Inform students that they will spend about two days on each activity within the project.

Activity One

Crunch! Crunch!

- As a class, brainstorm what you know about a zoo. For example, what do you see at the zoo, who do you see, and who works at the zoo.

- Lead a brief discussion about how mathematics could relate to the zoo.

- Pass out Student Resource 1 and highlight important information needed to complete the task:
  - -using the key for information
  - -change all animals weight to decimals

- Have students work with a partner to complete Student Resource 1. Each student must complete their own list, but can use their partner as a resource.
  - -Remind students that in order to complete the chart, they must use the weight of the animal to discover the appropriate name of food (encourage students to use the cuisenaire rods to justify all of their answers)
  - -If pairs come up with different answers, encourage reasoning behind decisions in class discussion.

- As a class look throughout the classroom to discover fractions around the room. Encourage students to use magazines, walls, pictures, furniture to make this connection. Some possible answers might be:
  - -There is 1 window is open out of all 5, so 1/5
  - - I sit at one desk at a table group of 4, so 1/4
  - -The small chalkboard is about half the size of the big one, so 1/2

- Pass out Student Resource 2 and highlight important information needed to complete the task:
  - - students need to note the similarities and difference between Student Resource 1 and 2
  - - students need to reduce fractions to lowest terms
  - - use cuisenaire rods to justify all answers

Activity Two

Spectators in View!

- Lead a discussion in the classroom about why there are limits upon the number of people allowed in the school gymnasium. Brainstorm ideas on chart paper while labeling all students responses. Possible ideas should lead to:
  - -fire marshal determined the limitations for safety
  - -you could get trampled
  - -you would not be able to move at ease

Eventually tie this discussion back to the exhibits at the zoo. Have students come to the conclusion that only a certain amount of visitors are allowed to see each exhibit at a time for similar reasons.

- Pass out Student Resource 3 and highlight the important information needed to complete the task:
  -no more than 100 people allowed in the exhibit at a time
  -convert percentages to decimals and then fractions
  -encourage students to use the Explorer Calculator, cuisenaire rods, decimal squares to verify answers

- Have students work with a partner to complete Student Resource 3. Each student must complete their own list, but can use their partner as a resource.

- Have students analyze their findings and discuss if using the calculator made a difference and why.

- Pass out Student Resource 4 and use the information from the chart in 3 to order the fractions from least to greatest. Have one student from each group, write results on the board. Allow each partner to defend their reasoning and compare results to determine correct order.

- Have students complete Student Resource 4, section C and D while working with a partner. Allow time to discuss results and compare responses.

Activity Three

It Sure Adds Up!

- As a class brainstorm why a zoo keeper might want to add or subtract animals weights. Lead students to realize that doing these things helps determine:
  -how much food they will need
  -how large a cage needs to be
  -what animals can live together

- Explain to students that they will be adding and subtracting fractions of weight with like and unlike denominators. The teacher needs to explain that the fractions of weight are not accurate. Students will be reading a chart for information to help solve various word problems involving the zoo animals.

- Pass out Student Resource 5 and 6. Allow time for students to complete. Remind students to label their answers. Encourage students to use decimal squares, cuisenaire rods, and calculators to verify answers.

- Have students share results with another partner group. Set criteria for group discussion and have students justify their answers.

- Have students get into groups of four to complete Student Resource 5. This section is quite challenging so you may want to model the following:

  Sara needed to know how much dog food to buy at the bulk food section of the grocery store. The following amounts are what she needed to buy.
  1/6 cup of dry food
  3/12 cup of wet food
  1/4 cup of can food
  1/3 cup of mixed food
  6 1/2 cup of water
  1/2 cup of treats

Once converted to a denominator of 12, this will equal 8!

Allow time to complete section D.

Activity Four

Look What I Found!

- Distribute the Student Resource 7.
- The class will be introduced to a writing prompt encouraging their creative imaginations. You will need to review with your class certain writing standards that ensure quality pieces of written work. For guidance to score their responses, use the following rubric.
- This is a three point rubric that will justify all types of written responses.

RUBRIC

3 points: -outstanding capitalization, punctuation, spelling, and grammar
-includes an appropriate title
-answered and completed all questions
-detailed sentences
-creative
-clearly expressed ideas

2 points: -some errors with capitalization, punctuation, spelling, and grammar
-basic title
-completed at least 3 of the questions
-fragmented sentences
-some unclear sentences

1 point: -many errors with capitalization, punctuation, spelling, and grammar
-no title, or vague
-poorly detailed sentences
-did not follow the specific questions to use as guideline

- When students complete their final copies, have a gallery walk displaying stories and illustrations.

Performance Assessment:

Throughout this project there should be continuous assessment throughout all activities. Assessment is intertwined within the project so that it seamlessly combines instruction with culminating activities. The teacher should actively observe students at work during group and individual areas.

Extension/Follow Up:

- Collect information about weight and height of other animals and graph
- Visit a local zoo and observe fractions in action
  -for example, one baby elephant amongst two parent equals 1/3!
- Convert your fraction discoveries of the zoo into decimals and percents
- Make a graph regarding the information from the zoo
- Take a survey about students' pets
  -find the percentage of who has dogs
  -find the percentage of who has cats
  -compare your results
  -is there a pattern
  -graph your results
- Design a glyph using fractions, percents, and decimals
- Writing prompts are always fun!

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Student Resource Sheet Cover

A Trip to the Zoo!

A Trip to the Zoo
Activity 1

Crunch ! Crunch !

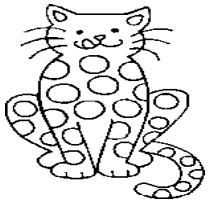
Teacher Resource Sheet 1

Each animal has a certain weight. Using the key below, determine the type of food it will need.

Don't forget to change all animals' weight to decimals and reduce to lowest terms.

Animal	Weight in Fraction	Weight in Decimal	Name of Food
Parrot	**12 $\frac{1}{2}$ lbs.**	*12.5 lbs.*	*Goopy Glop*
Baby Elephant	**140 $\frac{3}{100}$ lbs.**	*140.03 lbs.*	*Biggy Beef*
Monkey	**17 $\frac{8}{10}$ lbs.**	*17.8 lbs.*	*Goopy* Goop
Leopard	**40 $\frac{1}{2}$ lbs.**	*40.5 lbs*	*Pinky Poof*

Amount of Food	Names of Food
0 -20 lbs.	Goopy Glop
20 -40 lbs.	Yucky Yip
40 -60 lbs.	Pinky Poof
60 -... lbs.	Biggy Beef



A Trip to the Zoo
Activity 1

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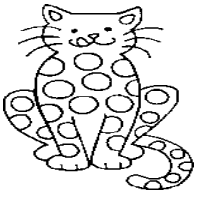


A Trip to the Zoo
Activity 1

Crunch ! Crunch !

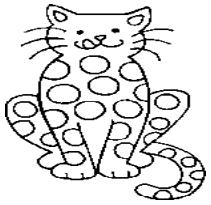
Student Resource Sheet 2

Use the same information as in Activity 1A. Using the key below, determine the type of food it will need.

Take a look at the key to see if there are any changes. Make those changes if needed on your chart.

Animal	Weight in Fraction	Weight in Decimal	Name of Food
Parrot	**$12\frac{1}{2}$ lbs.**		
Baby Elephant	**$140\frac{3}{100}$ lbs.**		
Monkey	**$17\frac{8}{10}$ lbs.**		
Leopard	**$40\frac{1}{2}$ lbs.**		

Amount of Food	Names of Food
0 -$17\frac{5}{10}$ lbs.	Goopy Glop
$17\frac{5}{10}$ -$40\frac{5}{10}$ lbs.	Yucky Yip
$40\frac{5}{10}$ -$100\frac{5}{10}$ lbs.	Pinky Poof
$100\frac{5}{10}$ -$150\frac{5}{10}$ lbs.	Biggy Beef



A Trip to the Zoo
Activity 1

Crunch ! Crunch !

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Take a look at the key to see if there are any changes. Make those changes if needed on your chart.

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Parrot	**$12\frac{1}{2}$ lbs.**	***12.5 lbs.***	***Goopy Glop***
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Monkey	**$17\frac{8}{10}$ lbs.**	***17.8 lbs.***	***Yucky Yip***
Leopard	**$40\frac{1}{2}$ lbs.**	***40.5 lbs.***	***Pinky Poof***

Amount of Food	Names of Food
0 -$17\frac{5}{10}$ lbs.	Goopy Glop
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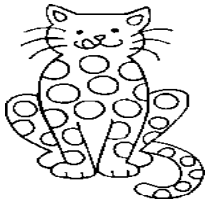

A Trip to the Zoo
Activity 2

Student Resource Sheet 3

Spectators in View !!

A. No more than 100 people are allowed in the exhibits below. Using the data provided, convert the number allowed into a percentage.

Change the percentage to a decimal and fraction. Use the Explorer to help.

ANIMAL	Total # of Students	# allowed in exhibits	% allowed	Decimals	Fractions
 Giraffe	100	25			
 Elephant	10	4	4%	0.4	$\frac{4}{10}$
 Monkey	100	50			
 Lion	100	100			

A Trip to the Zoo
Activity 2

Teacher Resource Sheet 3

Spectators in View !!

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Change the percentage to a decimal and fraction. Use the Explorer to help.

ANIMAL	Total # of Students	# allowed in exhibits	% allowed	Decimals	Fractions
 Giraffe	100	25	*25%*	*.25*	$\frac{25}{100}$
 Elephant	10	4	4%	0.4	$\frac{4}{10}$
 Monkey	100	50	*50%*	*.5*	$\frac{50}{100}$
 Lion	100	100	*100%*	*.1*	$\frac{100}{100}$

A Trip to the Zoo! Student Resource Sheet 4

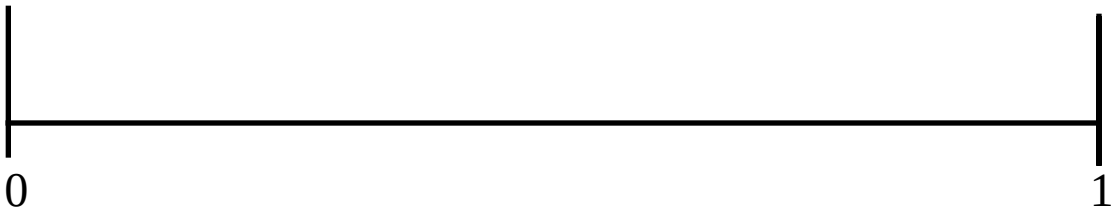
Activity 2 B,C,D

B. Using the information in Activity A, order the fractions from least to greatest.

_____, _____, _____, _____

C. If you ordered the percentage and decimal columns from least to greatest, would you get the same answer as in question B? Why or why not?

D. Using the information in Activity B, plot the fractions on the number line below.



A Trip to the Zoo! Teacher Resource Sheet 4

Activity 2 B,C,D

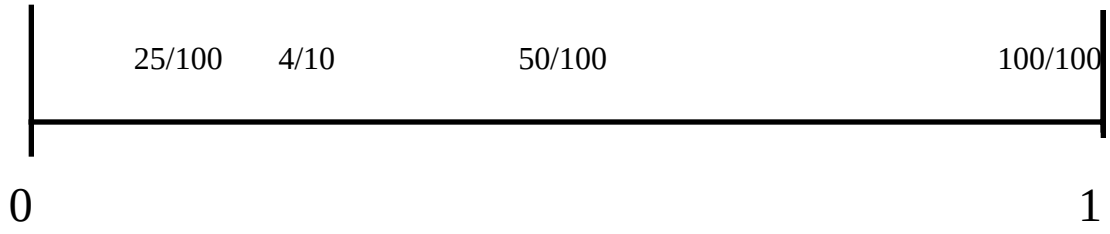
B. Using the information in Activity A, order the fractions from least to greatest.

25/100, 4/10, 50/100, 100/100

C. If you ordered the percentage and decimal columns from least to greatest, would you get the same answer as in question B? Why or why not?

The answers are the same when you arrange the same numbers using decimals and percents. Equivalent numbers can be expressed in many ways.

D. Using the information in Activity B, plot the fractions on the number line below.



It Sure Adds Up!

Use the same information in the table to answer the following word problems. *Be sure to label your answers.*

Animal	Weight
Giraffe	8 10 lbs.
Monkey	4 5 lbs.
Leopard	2 10 lbs.
Camel	6 1 2 lbs.
Elephant	1 2 lbs.
Lizard	3 5 lbs.
Parrot	8 80. lbs
Lion	1 5 lbs.

A. The elephant and the camel fell in love. The zoo keeper needs you to find out how much they weigh.

1. Add the elephant and the camel together.

_____

B. The monkey and leopard got into trouble. The owner of the zoo decided they needed to live together to settle their differences.

1. Estimate if their weight would be closer to 0,1/2, or 1?

_____

2. How much do they weigh?

_____

3. How much more does the giraffe weigh?

_____

A Trip to the Zoo
Activity 3

It Sure Adds Up!

Teacher Resource Sheet 5

Use the same information in the table to answer the following word problems. *Be sure to label your answers.*

Animal	Weight
Giraffe	8/10 lbs.
Monkey	4/5 lbs.
Leopard	2/10 lbs.
Camel	6 1/2 lbs.
Elephant	1/2 lbs.
Lizard	3/5 lbs.
Parrot	8/80. lbs
Lion	1/5 lbs.

A. The elephant and the camel fell in love. The zoo keeper needs you to find out how much they weigh.

1. Add the elephant and the camel together.

7 lbs.

B. The monkey and leopard got into trouble. The owner of the zoo decided they needed to live together to settle their differences.

1. Estimate if their weight would be closer to 0,1/2, or 1?

1

2. How much do they weigh together? *1lb.*

3. How much more does the giraffe weigh? *8/10 lb.*

It Sure Adds Up!

C. The zoo keeper needs to know how much all the animals weigh. Find the greatest common factor for all the animals. Then add them together to help the zoo keeper.

It Sure Adds Up!

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8/10 + 4/5 + 2/10 + 6 1/2 + 3/5 + 8/80 + 1/5=

Change <u>all</u> **denominators** to **10**

8/10 + 8/10+ 2/10+ 65/10 + 6/10+ 1/10 + 2/10=
92/10 or 9 2/10

Final answer: all of the animals in the zoo weigh 92/10 or 9 2/10

Look What I found!

Imagine that your favorite animal from Activity 4 has escaped from the zoo. Use the following guide questions to help create an interesting and detailed story.

-what is your animal?
-what was it doing?
-where did you find it?
-did the animal ever return to the zoo?
-how did you feel throughout this experience?

Draw a picture that describes where you first found the escaped animal on a separate piece of blank paper!